Optimal Timing For Transfer Out of ICU

Allan Garland, MD, MA
Associate Professor of Medicine & Community Health Sciences
University of Manitoba
No Conflicts to Declare
Introduction

- There are no evidence-based guidelines (or non-evidence-based ones) to tell us when it’s OK for patients to leave ICU

- Bed availability (in ICU, out of ICU) often exerts considerable influence on this decision

- Some evidence suggests that patients who leave prematurely have worse outcomes (BMJ 322:1274, 2001; Lancet 355:1138, 2000)

- No studies have assessed consequences of leaving later than bedside clinicians deem appropriate

- GOAL: Assess how the timing of transfer out of ICU affects mortality
Methods

• Prospective collection and analysis of 5 years of data from a single, 13-bed, closed-model, medical ICU of a 520-bed, tertiary care, public hospital in Cleveland, Ohio

• Due to inadequate regular ward and stepdown beds, this ICU frequently had patients who stayed in ICU for significant periods after deemed ready to be transferred out

• Decisions to transfer patients out of ICU -- made by the ICU attending & fellow; no set policies about this were in place

• Included: 1st ICU admissions of all patients who left ICU alive
Methods

- Recorded timing of: (1) hospital admission, (2) ICU admission, (3) request to transfer the patient out of the ICU, (4) transfer out of ICU, and (5) hospital discharge

- Pre-ICU length of stay = from hospital admission to ICU admission

- $\text{ICULOS}_{\text{desired}} = \text{from ICU admission to transfer request}$

- ICU Discharge Delay = from transfer request to leaving ICU

- Excluded if: Transferred to another hospital; ICU Discharge Delay $> 96$ hrs (very long delays likely different)

- Mortality status from State of Ohio Death Registry
Methods: Analysis

• Primary outcome = 30 day mortality
• Multivariable logistic regression, including:
  – ICU discharge delay -- as restricted cubic splines
  – age, sex, race
  – # presence of 31 comorbid conditions (Med. Care 36:8,1998)
  – admit dx -- as organ system responsible for ICU admission
  – APACHE II Acute Physiology Score; Need for invasive MV
  – Pre-ICU location; Pre-ICU LOS
  – ICU admission at night (8pm-8am); ICU admission on weekend
  – Care limitations at any time in ICU
  – transfer request made at night; request made on weekend
  – ICULOS_{desired}
Patients

- N=2401 unique ICU survivors
- ICU Discharge Delay: 9.6±11.7 hrs (range 0-93 hrs)
  - 0 to 12: 78.9%
  - 12.01 to 24: 11.2%
  - 24-96 hrs: 9.9%
- Mean age=56, 52% male, mean APACHE II score=17.5, 25% intubated
- Mean ICU length of stay = 2.98 days
- Hospital mortality = 5.7%
- 30 day mortality = 10.1%
Results: Model of 30 day Mortality

- Significant variables: age, sex, comorbid conditions, pre-ICU location, acute diagnosis category, AP2 APS, need for MV, orders limiting use of life-supporting therapies, ICU Discharge Delay
Results

• Sensitivity analysis -- similar findings if restricted consideration to those with ICU Dischage Delay < 72 hrs

• Issue/concern -- longer delays might be due to recurrent/worsened illness while waiting for a ward bed
  – our data did not include such information, but we did an analysis to try and assess it
  – multivariable model of Y="long delay" (90th percentile, quantile regression)
  – same x-variables + ICU discharge location + # of same-sex patients simultaneously awaiting transfer out of this ICU
  – RESULT: the predictive power of this model was almost entirely associated with this last variable; admission illness type & severity were not related to long delays
Summary & Discussion

- We observed complex effect of delays in leaving ICU

- Falling risk of death with delays up to 20 hrs
  - average patient would benefit from another day in ICU
  - may indicate that clinical judgement is inadequate for deciding when patients are ready to leave ICU

- Higher mortality with even longer delays
  - this phenomenon has not been described before
  - possible mechanisms (speculative): prolonged exposure to ICU pathogens, dangerous devices (e.g. CVC, A-lines) not removed until patient is actually out the door

- Major limitation -- single center study
Final Thoughts

• Relative to highly variable “wild type” practices regarding when to send patients out of ICU (that exist without any evidence base) there appears to be an optimal timing for being transferred out of ICU

• The magnitude of these observed differences in mortality suggest that this topic is relevant to patient care, and that we need to start developing an evidence base related to it
  - additional studies demonstrating the generalizability of our findings to other sites
  - more complete analysis including serial information about severity of illness -- on day of first transfer request, on day of actual transfer, etc.
1 Apple every 8 hours will keep 3 doctors away